

REMARKS

Upon entry of the instant amendment, claims 1-4, 6-9, 11-12, 15-18 and 20 will remain pending in the above-identified application.

In this Amendment, claims 1, 7, 12 and 16-17 have been amended and claim 13 has been cancelled.

In particular, in claims 1, 7, 12, and 16, the phrases “said carbon black comprises” and “said carbon black comprising” have been amended to recite “said carbon black consists essentially of” and “said carbon black consisting essentially of,” respectively. Further in claim 17, the phrase “and at least 10% by weight of said carbon black particles, based on the total weight of the carbon black, has said aspect ratio of 1.0 to 5.0 and said largest particle size of 10 gm or less” has been deleted.

Accordingly, the present amendments to the claims do not introduce new matter into the application as originally filed. As such entry of the instant amendment and favorable action on the merits is earnestly solicited at present.

Claim Rejection under 35 U.S.C. § 103(a)

Claims 1-4, 6-9, 11-13, 15-18 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kizu et al. US'739** (US 2003/0165739) in view of **Takami et al. US'387** (US 5,753,387) and further in view of **Ohsaki et al. US'043** (US 5,856,043) or over **Ohsaki et al. US'043** in view of **Kizu et al. US'739** and further in view of **Takami et al. US'387**.

Reconsideration and withdraw of the above outstanding rejection is respectfully requested based on the following considerations.

Legal Standard for Determining Prima Facie Obviousness

MPEP § 2141 sets forth the guidelines in determining obviousness. First, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

- (a) determining the scope and content of the prior art;
- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating any evidence of secondary considerations.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the Examiner has to provide some rationale for determining obviousness. MPEP § 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

- (a) *combining prior art elements according to known methods to yield predictable results;*
- (b) *simple substitution of one known element for another to obtain predictable results;*
- (c) *use of known technique to improve similar devices (methods, or products) in the same way;*
- (d) *applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;*

- (e) *"obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success*
- (f) *known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;*
- (g) *some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.*

As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See MPEP § 2143.03.

Distinctions Over the Cited Art

In support of the outstanding obviousness rejection, the USPTO alleges as follows:

- 1) *In Kizu et al. US'739, the negative electrode material comprises particles having an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 µm or less.*
- 2) *In Ohsaki et al. US'043, the carbon black comprises particles having an aspect ratio in the range of 1.0 to 5.0 and a largest particle size of 1-10 and preferably 2-5 µm.*
- 3) *In Takami et al. US'387, the negative electrode material comprises particles having an aspect ratio of 2.0 to 10.0, and the preferred particle size is 5-10 microns.*

However, it is submitted that the above USPTO allegations are most probably incorrect and/or they otherwise find no direct support in the applied cited art. In support of this contention the following points a) to c) of distinction are noted.

a) Kizu et al. US'739 includes the following descriptions in paragraphs [0134], [0135] and [0137] thereof (*emphasis added*):

[0134] *In the present invention, the graphitized carbon is used in a granular state, like a typical graphite type negative electrode active material. ... However, from the aspects of easiness of coating a current collector and possible orientation of particles after coating, the graphitized carbon is preferably fibrous.*

[0135] *Thus, a fibrous mesophase type graphitized carbon, namely, mesophase type graphitized carbon fiber, is particularly preferably used. ...*

[0137] *...The aspect ratio (average fiber length/average fiber diameter ratio) is preferably 1-5.*

Accordingly, Kizu et al. US'739 describe only the aspect ratio of the graphitized carbon as a negative electrode active material. Kizu et al. US'739 does not describe any aspect ratio of carbon black which is used as a conductive material. Carbon black is never "graphitized carbon".

b) In connection with an aspect ratio of carbon, Ohsaki et al. US'043 describes as follows:

"The average aspect ratio of the graphitized vapor-phase grown carbon fibers is in the range of 2-30, preferably 3-20, more preferably 5-15." (See column 4, lines 32-34)

As such, Ohsaki et al. US'043 describes only the aspect ratio of the graphitized vapor-phase grown carbon fibers which are used as negative electrode active materials. It does not describe any aspect ratio of carbon black which is used as a conductive material.

Furthermore, Ohsaki et al. US'043 includes the following description:

"The graphitized vapor-grown carbon fibers normally have an average diameter of 1-10 µm, preferably 2-5 µm. The average diameter in the range of 1-10 µm allows the dispersion of the fibers with a binder in an organic solvent to easily be realized and the fibers to be easily brought into contact with each other. This leads to increase in conductivity of the anode with a specific packing density so that it is unnecessary to add carbon black which is a material for improving conductivity, e.g. acetylene black." (See column 5, lines 4-12) (Emphasis added)

Accordingly, it is submitted that Ohsaki et al. US'043 provides no motivation for a person of ordinary skill in the art to use carbon black consisting essentially of particles having an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 µm.

c) In connection with the aspect ratio of carbon, Takami et al. US'387 describes as follows:

"If the aforementioned fibers is 10 to 100 µm in average fiber length and 1 to 20 µm in average diameter of the fiber, the aspect ratio (length of fiber/diameter of fiber) of thereof should preferably be in the range of 2 to 10." (See column 7, lines 8-10)

The carbon fibers having an aspect ratio of 2 to 10 have a fiber length of 10 to 100 µm on the average. This means that many of the carbon fibers have a length larger than 10 µm. In contrast, according to the present invention, the largest particle size is 10 µm or less.

In addition, according to Takami et al. US'387, the carbonaceous material, that is, the carbon fiber preferably has a peak in powder X-ray diffraction which corresponds to not more than 0.340 nm in an interplanar spacing d_{002} derived from (002) reflection of a graphite crystallite (*see column 4, line 67 to column 5, line 4*). This peak indicates that the carbonaceous material used by Takami et al. US'387 is not carbon black.

Accordingly, **Takami et al.** US'387 does not describe the use of carbon black having an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 μm or less.

Moreover, as described in the present specification (*see page 8, line 19 to page 9, line 6 reproduced immediately below*), an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 μm or less are not inherent properties of carbon black, and such properties of the carbon black are not described or taught in any of the applied cited art.

Carbon black is often processed to form granular particles having a particle size of about a few hundred μm to about 1 mm to improve the handling of carbon black. When a negative electrode coating is prepared using such granular particles of carbon black, the surfaces of the granular particles are coated with the aqueous binder such as carboxymethylcellulose without being disintegrated. Thus, the negative electrode coating sometimes contains undispersed granular particles having a particle size of about a few hundred μm to about 1 mm. In such a case, the granular particles of carbon black should beforehand be milled with an apparatus, which can apply an impact on the particles such as a Henschel mixer, a jet mill, a hammer mill and the like, to provide particles having an aspect ratio of 1.0 to 5.0 and a largest particle size of 10 μm or less.

Based on the above considerations, it is submitted that no reason or rationale is provided in the instantly cited art that would allow one of ordinary skill in the art to arrive at the instant invention as claimed. Any contentions of the USPTO to the contrary must be reconsidered at present as they are not sustainable.

Conclusion

Based on the amendments and remarks presented herein the USPTO is respectfully requested to issue a Notice of Allowance in the matter of the instant application, clearly indicating that each of instantly pending claims 1-4, 6-9, 11-12, 15-18 and 20 are allowed and patentable at present.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey, Reg. No. 32,881 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____

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